

Embodied Carbon in Buildings Facts and Figures

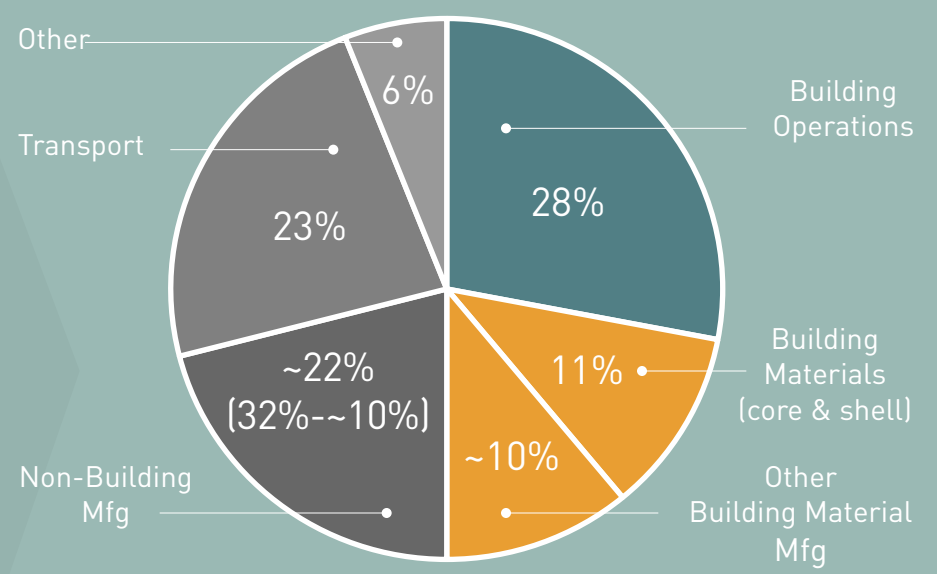
The Impact of Buildings on Carbon Emissions

Globally, the building and construction sectors account for nearly 40% of global energy-related carbon dioxide emissions in constructing and operating buildings (including the impacts of upstream power generation).¹ Current building codes address operating energy, but do not typically address the impacts 'embodied' in building materials and products. However, more than half of all GHG emissions are related to materials management (including material extraction and manufacturing) when aggregated across industrial sectors.² As building operations become more efficient, these embodied impacts related to producing building materials become increasingly significant.

¹ UNEP and IEA, "Global Status Report 2017: Towards a Zero-Emission, Efficient, and Resilient Buildings and Construction Sector," 2017.

² OECD, "Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences" (Paris, 2019), <https://doi.org/https://doi.org/10.1787/9789264307452-en>.

Global CO₂ Emissions by Sector



Adapted from 2019 Global Status Report, Global Alliance for Building and Construction (GABC) and Architecture 2030.

- The building and construction sector has a vital role to play in eliminating carbon, as it is responsible for at least 39% of global carbon emissions.

Carbon Emissions in Building: 'Upfront' Embodied Carbon and Operational Carbon



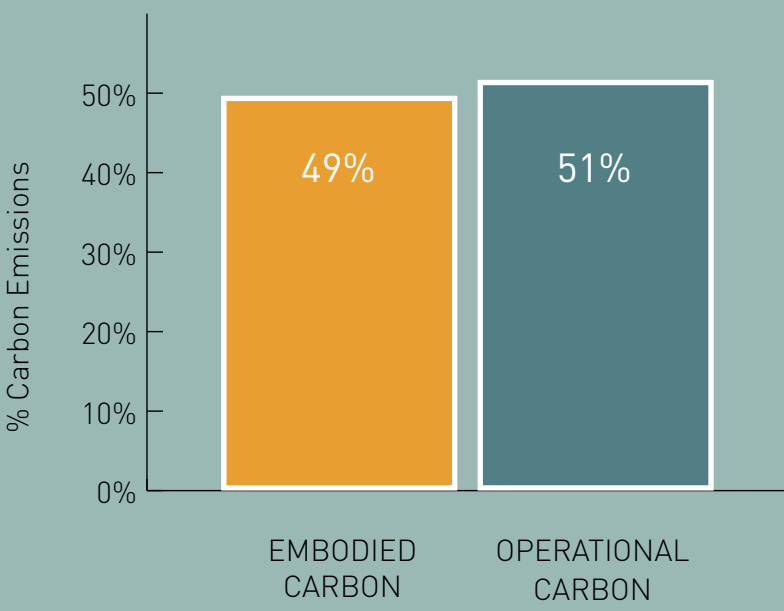
'Upfront' Embodied Carbon
Manufacture, transport and installation of construction materials

Operational Carbon
Building energy consumption

Image Source: Skanska USA

Total Carbon Emissions of Global New Construction from 2020-2050

Business as Usual Projection



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³ Architecture2030. https://architecture2030.org/buildings_problem_why/

⁴ Architecture2030. <https://architecture2030.org/new-buildings-embodied/>

⁵ materialsCAN Carbon Action Network. materialsCAN.org

The Growing Significance of Embodied Carbon

Between now and 2060 the world's population will be doubling the amount of building floor-space, equivalent to building an entire New York City every month for 40 years. Most of the carbon footprint of these new buildings will take the form of embodied carbon — the emissions associated with building material manufacturing and construction.³

Embodied carbon will be responsible for **almost half** of total new construction emissions between now and 2050.⁴

Unlike operational carbon emissions, which can be reduced over time with building energy efficiency renovations and the use of renewable energy, embodied carbon emissions are locked in place as soon as a building is built.⁵



This *Embodied Facts and Figures* document has been brought to you by the Carbon Leadership Forum.

To learn more, visit:
www.carbonleadershipforum.org

Who We Are

- The Carbon Leadership Forum is accelerating transformation of the building sector to radically reduce and ultimately eliminate the embodied carbon in building materials and construction.
- We are pioneering research, creating resources, and incubating member-led initiatives around this shared goal.
- We are architects, engineers, contractors, material suppliers, building owners, and policymakers who care about the future: we work collaboratively taking bold steps together for greatest collective impact.